

CLAIMS

What is claimed is:

- 1 1. A method of forming a fluid bearing, comprising:
  - 2 forming a plate having a face surface and a bonding surface opposing the face
  - 3 surface, said plate forming a surface of said fluid bearing;
  - 4 coupling a first side of a body to the bonding surface of the plate;
  - 5 placing the face surface of the plate against a predetermined surface; and
  - 6 generating a pressure difference to conform the face surface to the
  - 7 predetermined surface.
- 1 2. The method of claim 1, wherein during said generating step a pressure at the
- 2 bonding surface is greater than a pressure at the face surface.
- 1 3. The method of claim 1, wherein the predetermined surface is a guideway and
- 2 said plate has a pattern formed on said face surface.
- 1 4. A method of forming a fluid bearing as in claim 1 wherein said coupling step
- 2 uses an adhesive which is flexible before hardening and wherein said generating step
- 3 is performed during at least a portion of a time that said adhesive hardens such that
- 4 said face surface replicates a shape of said predetermined surface, and wherein said
- 5 plate is compliant.

1    5.    The method of claim 3, wherein the pattern provides channels for distribution  
2    of fluid flow on the face surface.

1    6.    The method of claim 4, wherein the plate comprises a material that can be  
2    etched and wherein a pattern is formed on said face surface by etching said face  
3    surface.

1    7.    The method of claim 4, wherein the generating step comprises injecting the  
2    adhesive under pressure and creating a vacuum between the face surface and the  
3    predetermined surface.

1    8.    The method of claim 4, wherein a pattern is formed on said face surface and  
2    the pattern includes a plurality of grooves coupled to an orifice.

1    9.    The method of claim 4, wherein a pattern is formed on said face surface and  
2    the pattern includes a plurality of grooves coupled to an orifice and a fluid flow  
3    restrictor on said face surface.

1    10.   The method of claim 4, wherein the pattern is formed by eroding said face  
2    surface.

1    11.   The method of claim 4, wherein said generating step comprises generating a  
2    vacuum which is applied through an opening in either the predetermined surface or  
3    said plate.

1    12. A fluid bearing produced according to the process of claim 4.

1    13. A fluid bearing comprising:

2              a plate support;

3              a flexible bearing plate having a bonding surface attached to said plate support  
4              with an adhesive which is flexible before hardening, and wherein said  
5              flexible bearing plate conforms to a predetermined shape.

1    14. The fluid bearing of claim 13, wherein a face surface of said flexible bearing  
2    plate has a plurality of grooves for distributing fluid pressure during use of said fluid  
3    bearing.

1    15. The fluid bearing of claim 13, wherein said flexible bearing plate is made to  
2    conform to said predetermined shape during at least a portion of a time that said  
3    adhesive hardens.

1    16. The fluid bearing of claim 15, wherein said flexible bearing plate is made to  
2    conform to said predetermined shape by pressing said flexible bearing plate against the  
3    predetermined shape.

1    17. The fluid bearing of claim 16, wherein the flexible bearing plate is made to  
2    conform by injecting the adhesive under pressure between the plate support and the  
3    bonding surface of said flexible bearing plate.

- 1    18.    The fluid bearing of claim 17, wherein the flexible bearing plate is made to
- 2    conform by applying a vacuum between a face surface which faces said predetermined
- 3    surface and said predetermined surface.
  
- 1    19.    A method of forming a vacuum chuck, comprising:  
2       bonding a back surface of the chuck plate to a bonding surface of a chuck  
3       body;  
4       placing a top surface of the chuck plate against a predetermined surface; and  
5       generating a pressure difference between the back surface of the chuck plate  
6       and the top surface of the chuck plate to conform the top surface to the  
7       predetermined surface.
  
- 1    20.    The method of claim 19, further comprising forming at least one opening on a  
2    top surface of said chuck plate, wherein at least one opening on the top surface of the  
3    chuck plate is for generating a vacuum and wherein the chuck plate is flexible.
  
- 1    21.    A method as in claim 20 wherein said vacuum is generated on said top surface  
2    during a use of said vacuum chuck.
  
- 1    22.    A method as in claim 21 wherein said top surface comprises a pattern of  
2    grooves on said top surface for distributing said vacuum, said pattern of grooves  
3    being coupled to said at least one opening.

- 1    23.    A vacuum chuck produced according to the process of claim 21.
- 1    24.    A method as in claim 22 wherein said pattern of grooves is etched on said top  
2    surface.
- 1    25.    A method as in claim 20 wherein said opening comprises a fluid flow  
2    restrictor.
- 1    26.    A method as in claim 21 wherein said bonding step comprises applying an  
2    adhesive which is flexible before hardening and wherein said generating step  
3    comprises generating a vacuum between said predetermined surface and said top  
4    surface during at least a portion of a time in which said adhesive hardens.
- 1    27.    A vacuum chuck produced according to the process of claim 26.
- 1    28.    A vacuum chuck comprising:  
2         a plate support;  
3         a flexible vacuum plate having a top surface for creating a vacuum at said top  
4                 surface, said flexible vacuum plate having a bonding surface which is  
5         attached to said plate support with an adhesive which is flexible before  
6         hardening, and wherein the flexible vacuum plate conforms to a  
7         predetermined surface.

1    29.    A vacuum chuck as in claim 28 wherein said flexible vacuum plate is made to  
2    conform to said predetermined surface during at least a portion of a time that said  
3    adhesive hardens.

1    30.    A vacuum chuck as in claim 29 wherein said vacuum chuck is used to secure a  
2    wafer during a wafer processing operation.

1    31.    A vacuum chuck as in claim 29 wherein the flexible vacuum plate is made to  
2    conform by applying a vacuum between said top surface and said predetermined  
3    surface.

1    32.    A vacuum chuck as in claim 31 wherein said top surface comprises a plurality  
2    of grooves for distributing a vacuum, and wherein said plurality of grooves is formed  
3    by etching said top surface.

1    33.    A method of forming a guideway, comprising the steps of:  
2         providing a face plate having a face surface and a bonding surface opposing  
3                 the face surface;  
4         bonding the bonding surface of the top plate to a body;  
5         generating a pressure difference to conform the face surface of the face plate to  
6                 a predetermined surface.

1    34.    The method of claim 33, further including the step of:  
2         heating the predetermined surface.

1    35.    The method of claim 33, wherein the bonding step uses an adhesive which is  
2    flexible before hardening and wherein said pressure difference conforms said face  
3    surface during at least a portion of time that said adhesive hardens.

1    36.    The method of claim 33, wherein the face plate and the body have a similar  
2    coefficient of expansion.

1    37.    The method of claim 33, wherein the face plate is plate glass and the body is a  
2    fiberglass pulltrusion.

1    38.    The method of claim 33, wherein the face plate is a metal tape and the body is  
2    a metal extrusion.

1    39.    The method of claim 33, wherein the predetermined surface comprises a  
2    vacuum generating surface.

1    40.    A method of forming a fluid bearing as in claim 7 wherein said generating step  
2    further comprises injecting at a predetermined pressure a fluid between the bonding  
3    surface and the first side, and wherein said predetermined pressure preloads said fluid  
4    bearing.

1    41.    A fluid bearing comprising:  
2              a bearing plate having a face surface;

3        a surface restrictor on said face surface, said surface restrictor for restricting  
4              flow of fluid in said fluid bearing, said surface restrictor comprising a  
5              channel formed on said face surface.

1        42.      A fluid bearing as in claim 41 wherein said surface restrictor is etched on said  
2              face surface.

1        43.      A vacuum chuck as in claim 31 wherein said top surface is etched to create a  
2              plurality of pins for supporting an object.

1        44.      A vacuum chuck as in claim 43 wherein said object is a semiconductor wafer.

1        45.      A method of forming a bearing member for a fluid interface comprising:  
2              etching a pattern in a bearing plate surface of a bearing plate, said bearing plate  
3              surface providing a surface for said fluid interface and said pattern  
4              providing for fluid flow in said fluid interface.

1        46.      A method as in claim 45 wherein said fluid interface comprises one of a fluid  
2              bearing or a vacuum chuck, and wherein said method further comprises bonding said  
3              bearing plate to a bearing member.

1        47.      A method as in claim 46 wherein said bonding step comprises applying an  
2              adhesive which is flexible before hardening between a bonding surface of said bearing

- 3 plate and said bearing member and pressing said bearing plate surface against a
  - 4 predetermined surface during at least a portion of a time that said adhesive hardens.
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- 1 48. A method as in claim 45 wherein said pattern comprises a fluid flow restrictor
  - 2 etched into said bearing plate surface.